

# Appendix C

## RECOMMENDATIONS FOR RELATED TECHNICAL CLASSROOM INSTRUCTION FOR SCIENCE, TECHNOLOGY, ENGINEERING, & MATH (STEM) YA

These recommendations are intended to be used by the Local YA Consortium when determining appropriate related technical instruction for Science, Technology, Engineering, & Math (STEM) YA. It is not all inclusive but should be used to assist the partnership with identification and/or development of course work that supports the work-based competencies as identified in the Skill Standards Checklist. As with all YA programs the consortium must ensure that the related instruction meets with the approval of their administration and school board.

### OPERATIONAL NOTES

- Related Technical Classroom Instruction maybe offered by the employer, within the school district, at another school district, at a Wisconsin Technical College, and/or at a Community College or University by instructors qualified according to the Youth Apprenticeship Program Operations Manual.
- Learning Objectives are the foundation of related technical classroom instruction. Consortiums may teach using locally developed coursework, however, it is recommended that agreements with the local technical college be pursued to obtain post-secondary credit for YA worksite and classroom experiences.
- A minimum of 180 hours (2 semesters) of related technical instruction is required for each one year YA program with 250 of the **work** hours coinciding with the instruction. The student must also receive high school credit towards graduation for this instruction, no matter the provider.
- It is suggested that the following courses or learning experiences be provided as a pre-requisite OR concurrently for students interested in this youth apprenticeship:
  - Introduction to STEM Careers
  - Engineering Pathway-
    - Basic Drafting with CAD software
    - Introductory overview of production/fabrication OR construction processes depending on specific area of interest
    - Strong math skills
  - Science Pathway-
    - Basic lab safety & techniques
    - Advanced science classes such as Molecular or Micro-Biology
    - Strong math skills
  - Additionally, students should complete a job shadow prior to enrollment in the STEM YA program.

- Commercial programs or Employer provided classroom certification programs are also appropriate provided that the student receives high school credit towards graduation for the class work. A variety of commercial courses are available. Programs that support Engineering or Biotechnology learning based on the Project Lead the Way curriculum units (<http://www.pltw.org/>) or STEM Academy curriculum units (<http://www.stem101.com/index.asp>) are appropriate for this YA program.
- Courses chosen should coincide as much as possible to occupational program requirements if the student intends to continue in the Wisconsin Technical College System or University of Wisconsin system.
- Recommendations for this Appendix were obtained from Employers, Wisconsin Technical College Faculty, Wisconsin secondary Career and Technical Education teachers, and YA Consortium/School District Coordinators during the STEM YA Survey, August 2010, and through the States' Career Clusters recommendations at <http://www.careerclusters.org/>- Funded in part by the U.S. Department of Education.



## Science, Technology, Engineering, & Math Youth Apprenticeship (YA) Plan of Study

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

The STEM Youth Apprenticeship Pathway Units and Related Technical Instruction course selection and delivery are entirely within local consortium control. The recommendations listed below are only a suggested path of YA STEM career planning and should be individualized to meet each learner’s educational and career goals. All plans should meet high school graduation requirements, as well as, college entrance requirements if applicable.

### HIGHLY Recommended for STEM YA students

Educational Level	Grade	English/ Language Arts	Social Studies Social Sciences	Math	Science	Career Pathway Courses  (Electives)	Recommended Enhancement Electives or Activities
<b>Secondary</b>	<b>9</b>	Oral Communications (Speech)		Algebra	Biology	<ul style="list-style-type: none"> <li>• IT Applications</li> <li>• Engineering Pathway-               <ul style="list-style-type: none"> <li>○ Computer Aided Drafting (CAD)</li> <li>○ Basic Fabrication or Building Processes</li> <li>○ Project Lead the Way, STEM Academy or similar</li> </ul> </li> <li>• Bioscience Pathway-               <ul style="list-style-type: none"> <li>○ Project Lead the Way, STEM Academy or similar</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Skills USA</li> <li>• 4H STEM</li> <li>• Battle Bots IQ</li> <li>• Lego Robotics</li> <li>• Science Olympiad</li> </ul>
	<b>10</b>	Business Communications		Geometry	Chemistry		
	<b>11</b>			Algebra II	Physics	<b>STEM Youth Apprenticeship - Level One or Two</b> <ul style="list-style-type: none"> <li>• Employability Skills</li> <li>• Customer Service</li> <li>• Bioscience Pathway- Lab Safety &amp; Techniques</li> </ul>	
	<b>12</b>			Trigonometry Calculus	Advanced Science in Pathway		

# Post-Secondary Occupational Opportunities

The chart below shows examples of career ladders organized by pathway.

For additional career cluster information, visit [www.careerclusters.org](http://www.careerclusters.org)

For additional career information on a specific occupation, visit <http://wiscareers.wisc.edu/> or <http://worknet.wisconsin.gov/worknet/default.aspx>

		High School Diploma, On-the-Job Training	Certificate, Licensing, and/or Associate's Degree (1-2 years college)	Bachelor's/Master's Degree (4 year college)
Science, Technology, Engineering, & Math (STEM) Pathways	Engineering & Technology	Drafter Helper Electrician Power Plant Operator	Agricultural Technician Applied Engineering Technician CAD Technician Civil Drafter Electronics Technician Electrical Drafter Industrial Engineering Technician Mechanical Drafter Nuclear Technologist Sound Technician Survey Technician	Aerospace Engineer Architectural Engineer Biomedical Engineer Chemical Engineer Commercial product designer Electrical Engineer Geothermal Engineer Industrial Engineer Mechanical Engineer Metallurgist Nuclear Engineer Systems Engineer Technical Writer Transportation Engineer
	Science & Math	Lab Aide	Animal Breeder Biomedical Technician Chemical Technician Food Quality Assurance Lab Technician Forest & Conservation Technician Geological Technician Medical Lab Technician	Analytical Chemist Archeologist Biologist Ecologist Environmental Scientist Food Scientists Forester Hydrologist Geologist Marine Scientist Materials Scientist Meteorologist Nanobiologist Science Teacher Soil & Plant Scientist Zoologist

SOURCES: The States' Career Clusters Initiative, 2010, [www.careerclusters.org](http://www.careerclusters.org); Worknet, 2010, <http://worknet.wisconsin.gov/worknet/default.aspx>, Waukesha County Technical College (WCTC), Susan Maresh, Waukesha County School-to-Work, 2007.